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An Evaluation of ON-PREMISE AND BAKE-OFF BAKERY DEPARTMENTS IN RETAIL FOODSTORES

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PREFACE

This study of in-store bakeries in retail food stores was conducted under the general direction of R. W. Hoecker, Transportation and Facilities Research Division, Agricultural Research Service.

Appreciation is expressed to the following companies for making available their bakeries for detailed study: Safeway Stores, Inc., Oakland, Calif.; Super Thrift Markets and P. A. and S. Small Co., York, Pa.; and Nowell's Super Market, Columbia, Mo. In addition, many other food chains provided valuable information that was used in a supplementary capacity.

The study was conducted under the specific direction of Dale L. Anderson, Transportation and Facilities Research Division, Agricultural Research Service.

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AN EVALUATION OF ON-PREMISE AND BAKE-OFF BAKERY DEPARTMENTS IN RETAIL FOODSTORES

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SUMMARY

Retail bakery departments that bake-off and finish frozen preformed products are able to achieve approximate labor savings of 41 percent, equipment savings of 22 percent, and space savings of 23 percent when compared with on-premise departments at similar sales volumes. However, the current costs of preformed frozen dough to the retail stores studied more than offset these savings with the result that the on-premise bakery with weekly sales of $1,200 or more was the more economical system. It is questionable whether any type of in-store bakery would be profitable at weekly volume levels much below $1,200.

If management decides to install a low-volume, in-store bakery department, a bake-off operation would be more economical than an on-premise operation. Bake-offs could become the more profitable system at all volume levels if the costs of frozen dough can be substantially reduced. Increasing the number of suppliers and developing economies of scale in the frozen dough industry would result in lowering the costs of this dough.

The bake-off systems studied had a limited product line, low-skilled employees, and a smaller percentage of store sales than on-premise bakeries. Some retail stores are putting skilled bakers in bake-off operations and are completely making some products on the premise to reduce costs of ingredients and to widen their line of bakery products.

With the exception of bread, all categories of bakery products had a lower production time per unit in the bake-off departments. The average cost of production labor of all 25 products studied was 41.3 percent lower for the bake-off system than for the on-premise system.

Costs of ingredients were about 69 percent more expensive for the bake-off than for the on-premise system when the product mix was held constant. However, more efficient preparation and distribution of frozen dough could reduce these costs substantially, such as through large-scale production of frozen dough by independent suppliers or by distribution centers of large food chains.

INTRODUCTION

The emergence of the modern supermarket has resulted in many innovations in the retailing of bakery products. One significant change has been the development of the complete bakery department, where some type of in-store baking is used to supplement the commercial baked goods section.

The two most prominent in-store baking systems, on-premise and bake-off, were analyzed to identify the cost and profit structure of each. [1] An on-premise bakery is a system where products are mixed, formed, baked, and finished for sale on the store premises. In a bake-off bakery, however, most products are mixed and partly formed at a central bakery, frozen, and then delivered to retail foodstores where they are completely formed, baked, and finished for sale.

The frozen dough industry is relatively young; only in the past few years has the bake-off bakery system emerged. The introduction of frozen dough enabled the bake-off system to gain popularity by permitting lower volume retail foodstores to have some type of in-store baking. With few exceptions, though, bake-offs have not obtained the weekly sales volume of most on-premise bakeries. As a result, little research has been done which effectively evaluates and compares these two systems. The purpose of this report is to aid industry in evaluating bake-off and on-premise bakery operations.

The objectives of this study are: (1) To determine characteristics of bake-off and on-premise bakery systems at their respective low and high levels of volume; (2) to compare total bake-off and on-premise operations at three selected levels of volume; (3) to compare production costs between an identical product mix selected from the two systems; and (4) to develop recommendations for improving both bake-off and on-premise bakeries.

Preliminary investigation indicated that the best results in the analysis of the two in-store bakery systems would be obtained using the case study approach. Data were obtained from 75 cooperating stores that had in-store operations. From this sample, four case stores were selected. Information from the total sample was used mainly as a basis for evaluating and comparing industry figures with those of the selected case stores. These four stores were chosen on the basis of their weekly bakery sales and willingness to cooperate.

The four supermarkets were studied in detail. Two of these stores had bake-off bakeries--firm A, a low-volume bake-off with weekly sales of $300 and firm B, a high-volume bake-off with weekly sales of $1,100. The other two stores had on-premise bakeries--firm C, a low-volume bakery with weekly sales of $1,400 and firm D, a high-volume bakery with weekly sales of $3,800. These volumes are typical of the range that exists within each system.

Procedures and methods used in the four bakeries were observed and time studies made of the major categories of bakery products produced in each system. Costs for ingredients, equipment requirements, space allocation, product-scheduling techniques, and product movement were studied. In addition, operating expenses and other business records were analyzed.

Sales in the bake-off departments were then projected to the weekly levels presently obtained in the on-premise departments. The two systems were compared at weekly bakery sales levels of $1,200, $2,400, and $3,600, or a 6 percent bakery sales

[1] Other types of in-store bakeries are mostly variations of these two systems.

to total store sales ratio for stores having total weekly sales of $20,000, $40,000, and $60,000, respectively. Total sales and backroom areas were assumed to be 15,000 square feet for the $20,000 store, 24,000 square feet for the $40,000 store, and 30,000 square feet for the $60,000 store.

Estimated requirements for equipment and production space were obtained from a bakery consulting firm. Ingredient and labor requirements were projected to large-scale operations through budgeting techniques.

A total of 25 bakery items, representing seven categories of bakery products, were studied in detail to determine the product-cost relationship between the two systems. The seven categories (bread, rolls, Danish pastry, pies, cupcakes, cakes, and doughnuts), constituted approximately 90 percent of the total bakery sales in the four stores studied.

PRODUCTION CHARACTERISTICS OF IN-STORE BAKERIES

Product Variety

Most in-store bakery departments produce a number of categories of products (such as bread, rolls, and Danish pastries). Within each category are several variations which can be offered to the consumer.

In the four case stores, 11 categories of bakery products were being produced in firms A, B, and D and 10 categories in firm C (table 1). This indicates that in-store bakeries produce about the same number of products regardless of the type or volume of the operation. However, varieties produced in the different categories increased as weekly sales increased. The bake-offs offered considerably fewer varieties than the on-premise departments. For instance, only 45 and 84 varieties were being produced in the bake-off firms compared with 107 and 129 varieties in the on-premise firms.

Figure 1 shows the number of varieties of products in relation to bakery sales for the four stores. The line is curvilinear since there is a limit to the number of different bakery items that can be made from the basic doughs.

These studies indicate that the number of varieties offered influences the sales in a bakery department. However, other factors also seem to affect sales, such as (1) bakery competition, (2) merchandising policies, (3) area location, and (4) customer ethnic groups.

Although low sales departments may be conducive to a limited line of products, this does not necessarily have to exist. For example, firm A could just as easily have produced several more varieties as many more varieties were available from suppliers of frozen products. If a larger selection had been available, it might have been an important factor in increasing customer demand and, consequently, sales.

Table 1.--Comparison of bake-off and on-premise bakery departments in 4 selected firms

Item	Bake-off		On-premise	
	Firm A	Firm B	Firm C	Firm D
Weekly bakery sales...dol..	299	1,087	1,414	3,847
Labor cost to sales...pct..	35.3	19.2	36.8	34.8
Categories of products.No..	11	11	10	11
Varieties produced.....No..	45	84	107	129

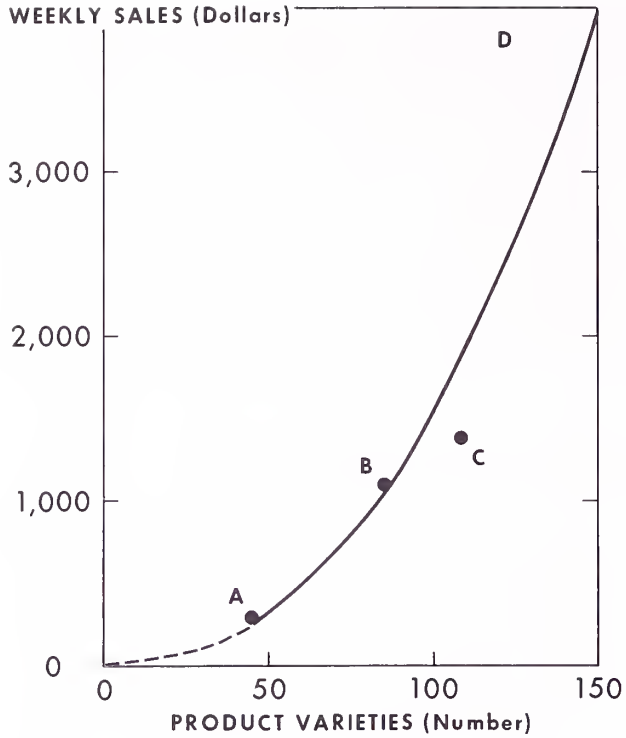

FIGURE 1.--A comparison of weekly bakery sales and varieties of bakery items produced in the four study stores.

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FIGURE 2.--Employee decorating a cake.

The lack of employee training was a major reason for the limited varieties produced in the bake-off operations. In firm A, employees were taught to bake only the basic products. They were given little formal training or incentive to create different items. Limited decorating was practiced in firm B, which seemed to be a highly successful technique for attracting customers (fig. 2). In contrast, both on-premise bakeries decorated to a much greater extent. Thus, a large variety of bakery products may be an important prerequisite for a successful bakery. But such an operation requires employees who are well-trained and have the necessary incentive to produce a variety of bakery items.

Production Scheduling

An effective step toward an efficient retail bakery is proper scheduling of daily production. However, scheduling is influenced by (1) demand, (2) bakery specials, (3) labor requirements, and (4) characteristics of the product (that is, shelf life and freezing ability).

Some varieties in each category are usually demanded more than others. They are standard varieties and include such items as white bread, apple pie, and individual Danish pastries. Specials influence production by disrupting the normal demand patterns of customers. Product labor requirements affect scheduling since different times and amounts of employee labor must be allocated to the production of the various products.

Production is also influenced by the basic characteristics of the different products. Some products (for example, Danish pastries) have a long shelf life and can be produced in larger quantities than others and remain fresh for several days. Others (for example, doughnuts) become stale

quickly and have to be made daily. A bakery item that can be frozen without losing any of its quality affects product scheduling since economies of large-scale production can be achieved even in a low-volume operation. Larger quantities of such items can be produced at wider intervals and frozen until demanded.

None of the basic characteristics of the different products can be changed drastically. However, certain improvements in the basic art of production scheduling could mean the difference between a profit and a loss in a store bakery. Of the four bakeries studied, only firm B kept any type of detailed production records.

Top management should realize the importance of effective production records. (1) They are an excellent tool for controlling production and reducing stale items and markdowns (fig. 3). A good record system enables the bakery manager to look at records of a comparable period in the past to get some indication of what had been made, sold, and discarded during the same or another time period. (2) Records show possible problem areas in production scheduling. (3) A historical record aids management in evaluating employee performance. (4) Records help bridge the experience gap in personnel changes.

PRICING CHARACTERISTICS OF IN-STORE BAKERIES

Product pricing is another integral part of managing a retail bakery department. Prices are affected by such factors as production costs, special sales, desired markup, competition, and customer acceptability.

Several basic techniques of pricing were used throughout the industry. Some methods included pricing by (1) multiplying the ingredient costs by some number (usually 3), (2) multiplying the ingredient costs by some number plus adding a small percentage for product losses, and (3) using suggested price lists from wholesale suppliers. Often, the basic prices were then adjusted according to the previously mentioned factors.

Basing price on costs of ingredients was widely used in the baking industry. Various authorities in industry suggested that a retail price for a product can be obtained by multiplying the basic ingredient costs by 3.

The variability of prices per product among firms is shown when the four stores are compared. The average price per unit was slightly different in each store (table 2). The studies also indicate that product gross profits may vary among products and among stores. For example, in firm B, cupcakes were losing 7.8 percent while the other products showed a profit. Firm A, the low-volume bake-off operation, with weekly sales of $300, was losing money on all products. In firm A, price acceptability by customers had been tested by the bakery manager and increasing prices resulted in a reduction in sales.

Store

Manager

Week ending

Product	Unit of measure	Retail price	Units produced							
			Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Total
Pies Apple.....	Each	0.65	--	2	4	6	--	5	5	22
Bread White.....	Each	.30	--	20	20	40	20	20	20	140
Cookies Chocolate chip	Dozen	.35	--	2	2	2	2	4	2	14

Product	Unit of measure	Retail price	Units marked down							
			Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Total
Pies Apple.....	Each	0.65	--	1	--	1	--	--	2	4
Bread White.....	Each	.30	--	2	--	--	1	--	--	3
Cookies Chocolate chip	Dozen	.35	--	--	--	--	1	1	--	2

Product	Unit of measure	Retail price	Units discarded							
			Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Total
Pies Apple.....	Each	0.65	--	1	--	--	--	--	1	2
Bread White.....	Each	.30	--	1	--	--	--	1	--	2
Cookies Chocolate chip	Dozen	.35	--	--	--	--	--	1	--	1

Figure 3.--Sample form for keeping production records.

Table 2.--Comparison of prices and costs of specified categories of bakery products in 4 study stores[1]

Product	Bake-off bakeries								On-premise bakeries							
	Firm A				Firm B				Firm C				Firm D			
	Average price per unit	Average cost per unit	Difference		Average price per unit	Average cost per unit	Difference		Average price per unit	Average cost per unit	Difference		Average price per unit	Average cost per unit	Difference	
	Cents	Cents	Cents	Percent	Cents	Cents	Cents	Percent	Cents	Cents	Cents	Percent	Cents	Cents	Cents	Percent
Bread.....	31.92	43.55	-11.63	-26.7	31.37	27.82	11.3	11.3	26.30	20.23	6.07	23.0	27.01	22.61	4.40	16.3
Rolls.....	3.68	4.39	-.71	-16.2	5.11	4.27	3.55	16.4	3.77	2.78	.99	26.2	3.07	2.38	.69	22.5
Danish pastry.	14.07	14.71	-.64	-4.4	12.24	10.78	1.46	11.9	17.08	12.30	4.78	28.0	11.50	9.39	2.11	18.3
Pies.....	61.50	66.85	-5.35	-8.0	76.13	74.84	1.29	1.7	68.14	64.27	3.87	5.7	65.02	57.78	7.24	11.2
Cupcakes.....	8.84	12.27	-3.43	-28.0	7.00	7.59	-.59	-7.8	7.50	6.39	1.11	14.8	7.69	4.60	3.09	40.2
Cakes.....	66.69	71.69	-5.00	-7.0	71.93	58.62	13.31	18.5	150.03	129.10	20.93	14.0	130.83	92.76	38.07	29.1
Doughnuts.....	6.22	6.93	-.71	-10.2	(2)	(2)	(2)	(2)	5.94	3.94	2.00	.3	4.77	3.62	1.15	24.1

[1] Firms were classified as follows: Firm A, low-volume bakery department with weekly sales of $300; B, high-volume bakery with weekly sales of $1,100; C, low-volume bakery with weekly sales of $1,400; D, high-volume bakery with weekly sales of $3,900.
[2] Bought from outside sources.

LABOR

Total Labor Requirements

Labor is a major cost item in in-store bakeries. Therefore, proper scheduling of labor is essential to keep expenses at a minimum. This is especially true in very low-volume bakeries which require extremely effective allocation of labor to achieve even the minimum profit returns.

The labor necessary in both bake-off and on-premise bakeries can be divided into two categories--retail labor and production labor. The first includes employees who wrap and display the bakery products and wait on customers; the second, employees who mix, form, bake, and decorate these products.

Bakery employees concerned directly with the retail labor have similar duties in both bakery systems. If sales volumes are equal for the two bakery systems, retail labor requirements are the same, both in number of employees and wage cost per hour. However, bake-off operations require fewer and less-skilled production employees at the store level than on-premise operations because the products in bake-offs have already been mixed and partly formed when brought to the store. Also, bake-off employees receive lower wages than the qualified bakers in on-premise operations.

Production functions were more specialized in the high-volume than in the low-volume bakeries. For example, in firm D (high-volume on-premise bakery), one employee did nothing but decorate products, while in firm C (low-volume on-premise bakery), decorating was only one of the many duties of the head baker.

Labor cost of the bakery as a percentage of total sales was above 34 percent in both on-premise firms (table 1). The low-volume bake-off firm (firm A) had a 35.3 percent labor cost to sales ratio. Most low-volume bake-offs have a high labor cost because sales are not great enough to support the necessary labor requirements needed to cover all the retail store hours. As a result, many low-volume bake-offs are plagued by a great amount of unproductive labor. However, the higher volume bake-off operation (firm B), with weekly sales of $1,087, had only a 19.2 percent labor cost to sales ratio. Therefore, it seems that substantial savings in total labor can be realized in a bake-off operation over an on-premise operation when sales are sufficient to keep unproductive labor at a minimum.

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Product Labor Requirements

For comparison, the rest of this report is a projection of the case studies to hypothetical volumes. The four study stores will continue to be discussed when appropriate to coordinate actual results with the somewhat theoretical aspects of the comparison.

Wage rates of $2.25 per hour were used for production employees in the bake-offs and $3.25 in the on-premise, except for employees making doughnuts where $2.25 was used in both systems. These rates tend to reflect the production skill involved in each type of bakery system. An additional 15 percent was added to these wage rates for fringe benefits.

Labor times are based on 100 percent efficiency, although it is impossible to schedule production so all employees are constantly working at full capacity. As a result, product times achieved in the time studies are lower than would normally be found in either type of retail bakery. For instance, the total elapsed time (which includes delays and unproductive periods) in firm C was 41.5 percent greater per loaf of bread than that for similar products using the elemental time study approach.

Labor costs for doughnuts were identical for both systems. Since we could not find any suppliers of frozen uncooked doughnuts, we assumed that all doughnuts were made from the basic ingredients at the store level.

All categories of bakery products showed a constant or declining labor time per unit as sales increased from $1,200 to $2,400 per week in both retail bakery systems (table 3). However, as sales rose to $3,600 per week, labor time per unit began to level off and for bread products started to increase. These results indicate that economies of large-scale production are possible as volume increases except where batch mixes can no longer increase at the same rate because of equipment capacity. When this occurs, time per unit levels off or increases if less than another full batch is produced.

In comparing the two systems, the bake-offs had a definite labor-saving advantage in production time per unit for all products except bread. Bread products in bake-offs require more labor time because the loaves have to be hand-formed (fig. 4). Although

Table 3.--Comparison of on-premise and bake-off bakeries in total units produced, time per unit, and cost per unit for 7 categories of bakery products at 3 selected sales levels[1]

Product	$1,200 sales level					$2,400 sales level					$3,600 sales level				
	Total units	On-premise		Bake-off		Total units	On-premise		Bake-off		Total units	On-premise		Bake-off	
		Time per unit	Cost per unit	Time per unit	Cost per unit		Time per unit	Cost per unit	Time per unit	Cost per unit		Time per unit	Cost per unit	Time per unit	Cost per unit
	No.	Minutes	Cents	Minutes	Cents	No.	Minutes	Cents	Minutes	Cents	No.	Minutes	Cents	Minutes	Cents
Bread.....	151	0.518	3.23	0.593	2.56	302	0.465	2.90	0.591	2.56	453	0.481	3.00	0.591	2.56
Rolls.....	576	.076	.48	.037	.16	1,152	.073	.45	.036	.16	1,728	.072	.45	.036	.16
Danish pastry.	288	.276	1.72	.087	.37	576	.245	1.53	.087	.37	864	.229	1.42	.086	.37
Pies.....	18	1.622	10.10	.235	1.02	36	1.369	8.53	.225	.97	54	1.271	7.92	.222	.96
Cupcakes.....	288	.091	.57	.066	.29	576	.089	.55	.064	.28	864	.089	.55	.064	.28
Cakes.....	56	1.939	12.08	1.351	5.84	112	1.886	11.75	1.347	5.82	168	1.889	11.77	1.346	5.81
Doughnuts.....	672	.231	1.00	.231	1.00	1,344	.208	.90	.208	.90	2,016	.207	.89	.207	.89
Total.....	3,049	--	--	--	--	4,098	--	--	--	--	6,147	--	--	--	--
Weighted average...	--	--	1.44	--	.82	--	--	1.32	--	.79	--	--	1.31	--	.78
Percentage difference	--	--	--	--	Percent 43.1	--	--	--	--	Percent 40.2	--	--	--	--	Percent 40.5

[1] Based on appendix table 12.

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FIGURE 4.--Bread products being formed by hand in a bake-off department.

some frozen breads are bought preformed, many industry authorities state that the bread should be reworked by hand to obtain the best quality. In the on-premise system, this function is performed by an automatic forming machine.

The lower wage rates in a bake-off operation more than offset the extra production time for bake-off bread production. For example, in the $1,200 sales level, production time for bake-off bread was 0.075 man-minute per loaf higher than the on-premise, but bake-off cost per unit was 0.67 cent less because of lower wage rates. The labor advantage in bake-off was even greater when wage rates were applied to the other products. The labor cost for production of all 25 products showed that the bake-off system saved 40.2 to 43.1 percent, or an average of 41.3 percent, when compared with the on-premise system (table 3).

Rolls, Danish pastry, pies, and cakes were considerably less time consuming in the bake-offs at all sales levels studied. The reason for this was that these products were almost entirely formed before being frozen and brought to the store. Production labor at the store consisted mainly of applying the finishing touches, such as fillings and icings.

Individual firms should apply their own wage rates to determine their product costs. Also, production time per product will vary among stores due to differences in backroom layouts, work methods, materials used, and equipment.

INGREDIENTS

Total Ingredient Requirements

Costs of ingredients for the on-premise system are the cost of the basic raw ingredients used in the various products. For example, the costs of ingredients for white bread would include the expense for sugar, milk, malt, flour, and any other ingredient needed. Costs of ingredients for the bake-off include the price a retail in-store bakery would have to pay for the frozen dough products plus any ingredients added at the store. Costs for ingredients were considerably more expensive in the bake-off departments than in the on-premise departments.

Product Ingredient Requirements

All products within each system were assumed to have identical costs for ingredients at the three projected levels of volume. Although variations could result from large-scale buying, geographical location, and transportation expenses, these variations were disregarded in this analysis. In both systems, the costs of ingredients for doughnuts would be the same since

all doughnuts were made from raw ingredients at the store level. On a per unit basis, the cost of ingredients for all the other categories of bakery products were lower in the on-premise system (table 4). Ingredients for the 25 bake-off products were about 69 percent higher than similar on-premise products.

If the current trend of an increasing demand for frozen dough continues, the present advantage of the on-premise bakery system in costs of ingredients may be narrowed in the future. Increased demand from more retail firms for frozen dough products would allow independent suppliers to expand production and produce these products at lower costs. Suppliers could then pass on the savings to the retail stores.

Another possibility for reducing costs of ingredients in bake-off might come from internal action within private food chains. If volume can be justified, firms could build their own frozen product plants, eliminating some of the cost of buying from an outside supplier. This practice is being used successfully by some large chains.

Table 4.--Comparison of costs of ingredients of 7 categories of bakery products for on-premise and bake-off bakery departments at $1,200 sales level[1]

Product	Total units produced	Costs of ingredients		Increased cost for bake-offs
		On-premise[2]	Bake-off[3]	
	Number	Cents	Cents	Cents
Bread	151	9.11	16.72	7.61
Rolls	576	.78	1.56	.78
Danish pastry	288	4.71	9.38	4.67
Pies	18	22.35	37.39	15.04
Cupcakes	288	2.60	3.90	1.30
Cakes	56	24.84	42.47	17.63
Doughnuts	672	1.40	1.40	--
Weighted average	--	3.25	5.49	2.24

[1] Based on appendix table 13.
[2] Includes costs of all raw ingredients.
[3] Includes cost of frozen dough product from supplier and any ingredient added at the retail store level, except for doughnuts which include costs for all raw ingredients.

OVERHEAD

In comparing the two bakery systems, overhead costs will include equipment, space, and miscellaneous expenses. Certain intangibles such as the allocation of parking lot space and checkout counters by departments are excluded since these costs are extremely hard to allocate and vary considerably among stores.

Equipment Requirements

One of the first steps toward achieving a profitable bakery department is securing the proper production tools. All retail bakeries should install equipment that is both adequate for the work to be performed and efficient enough to do the job with a minimum of labor. In many bakeries these guidelines are not being followed.

Many low-volume bake-offs were operating with less than the minimum amount of equipment needed to operate efficiently. For example, firm C did not have a freezer in the production area and the bakery department had to share freezer space with the frozen food department. As a result, there were conflicting interests between departments that caused problems for all concerned.

Many bakeries had outgrown their production facilities. Firm B, for example, had an 8- by 12-foot walk-in freezer that was too small and increased problems in controlling stock.

A comparison of the requirements for production equipment in the bake-off and the on-premise systems revealed that a greater initial investment in equipment was necessary in the on-premise system (table 5). The reason for this is that all products

Table 5.--Comparison of costs of equipment for on-premise and bake-off bakery departments, by specified weekly bakery sales[1]

Weekly sales	Costs of equipment requirements[2]		Difference in equipment cost for bake-off (col. 2 - col. 3)	
	On-premise	Bake-off		
(1)	(2)	(3)	(4)	(5)
	Dollars	Dollars	Dollars	Percent
$1,200...	18,735	15,750	2,985	15.9
$2,400...	25,520	17,725	7,795	30.5
$3,600...	33,946	26,755	7,191	21.2

[1] Equipment requirements and costs are based on data developed by Russell E. Davis Consulting Firm, Des Plaines, Ill.
[2] Based on tables 14 and 15. Freight and installation charges were considered proportional and excluded from the analysis.

have to be mixed and formed at the retail store level. Makeup equipment is expensive, but much more practical than hand-forming every product.

Figure 5 is a graphic representation of total costs for production equipment for both bakery operations with weekly sales of $1,200, $2,400, and $3,600.

Costs of equipment increased as sales increased in both systems but not in a directly proportional relationship. Equipment requirements between systems for the $1,200 $2,400, and $3,600 sales levels averaged 22.5 percent higher in the on-premise operations (table 5).

Depreciation and interest charges were determined for both bakery systems to compare accurately total production costs per individual product. Depreciation was allocated over an 8-year period with no equipment salvage value. Interest expense was determined by the formula

$$I = E \times R \frac{(N+1)}{2N},$$

where: I = average interest,
E = cost of equipment,
R = interest rate, and
N = expected life of equipment in years.

Again, an 8-year period was used with a 6-percent interest charge. These depreciation and interest charges were then adjusted from a yearly to a weekly basis (table 6).

Table 6.--Comparison of depreciation and interest charges per week for equipment for on-premise and bake-off bakeries, by selected weekly bakery sales

Weekly sales	Depreciation[1]		Interest[2]		Total expense	
	On-premise	Bake-off	On-premise	Bake-off	On-premise	Bake-off
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
$1,200..	45.04	37.86	12.16	10.22	57.20	48.08
$2,400..	61.35	42.61	16.56	11.50	77.91	54.11
$3,600..	81.60	64.31	22.03	17.37	103.63	81.68

[1] From exhibit 1, p. 21.
[2] From exhibit 2, p. 22.

A detailed breakdown of equipment requirements, costs, and charges for the three selected levels of volume are found in the appendix, tables 14 and 15. Exhibits 1 and 2 on pages 28 and 29, respectively, show the allocation of depreciation and interest charges.

Space Requirements

Space allocated to bakery display is influenced by such factors as (1) available store space, (2) desired merchandising techniques, and (3) expected sales volume. Production area, however, is controlled by the type of bakery system desired.

More production area is required in on-premise bakeries than in bake-offs because of the greater amount of mixing and forming equipment needed to produce baked goods from raw ingredients.[2] In both systems, production space requirements increase with department sales.

Comparing the two systems on a percentage basis showed that production space averaged 23.3 percent higher in on-premise bakeries. Production space required at the three selected volumes are shown in table 7 and figure 6.

[2] Space requirements are based on data developed by Russell E. Davis Consulting Firm, Des Plaines, Ill.

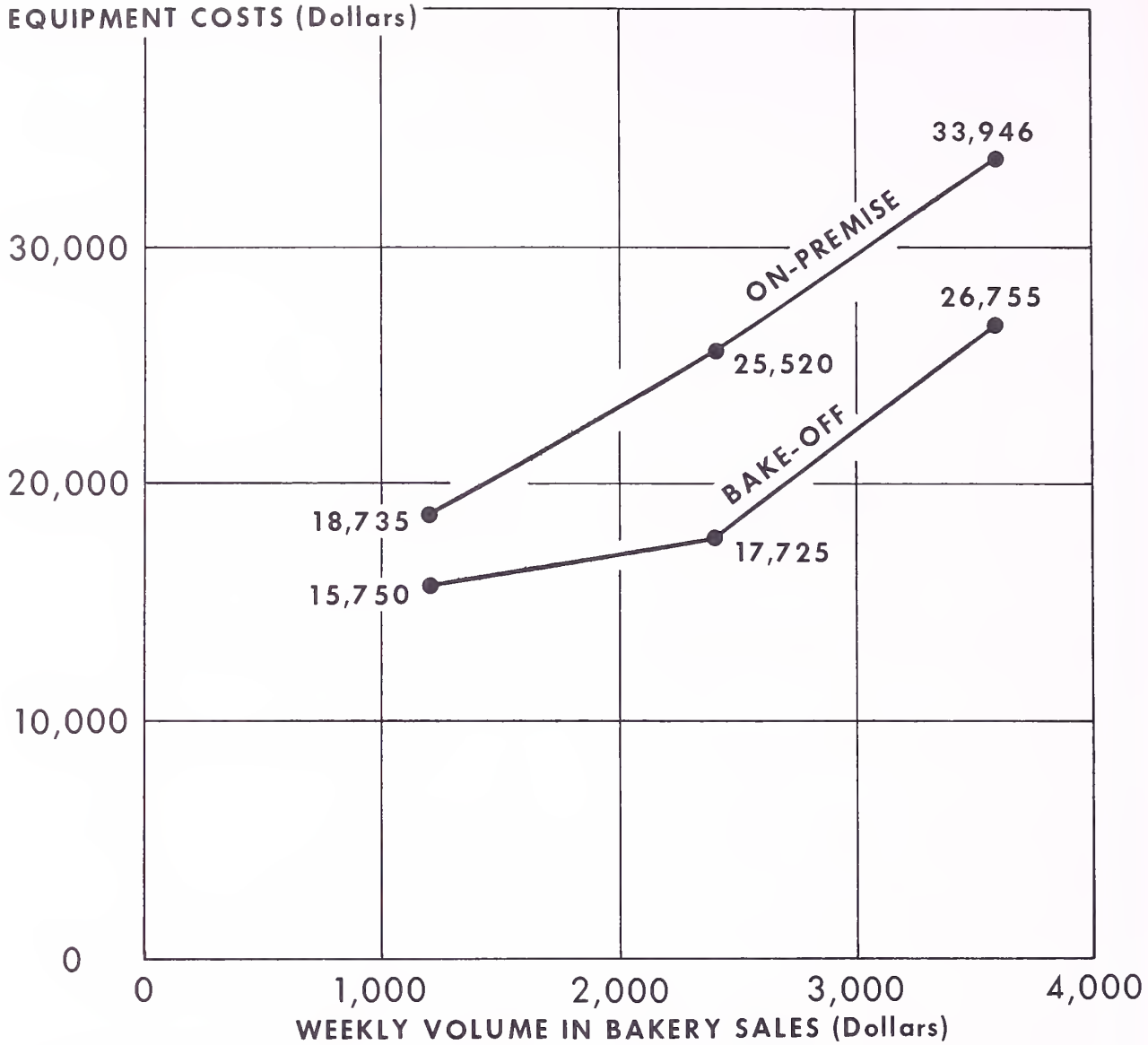

FIGURE 5.--Comparative costs of production equipment for on-premise and bake-off retail bakery departments.

Table 7.--Comparison of requirements for production space for on-premise and bake-off bakeries at selected sizes of retail stores and weekly sales for store and bakery

Size of retail store (sq. ft.)	Weekly sales		Production space				Reduction in bakery space for bake-off	
			On-premise		Bake-off			
	Total store	Bakery	Size	Percentage of total store	Size	Percentage of total store	Col. 4 - col. 6	Col. 5 - col. 7
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Dol.	Dol.	Sq. ft.	Pct.	Sq. ft.	Pct.	Sq. ft.	Pct.
15,000..	20,000	1,200	820	5.5	640	4.3	180	22.0
24,000..	40,000	2,400	1,100	4.6	840	3.5	260	23.6
30,000..	60,000	3,600	1,800	6.0	1,360	4.5	440	24.4

Figures 7 through 10 illustrate possible rectangular and L-shaped layouts with the necessary equipment for a bakery department achieving weekly sales of $2,400. Requirements for production space were approximately 1,100 square feet in the on-premise departments and 840 square feet in the bake-off departments. Production flow analysis, area arrangement, volume anticipation, inventory practices, and other basic layout principles were considered in the four layouts.

Space charges per week were allocated to the bakery department on the basis of bakery space occupied in relation to the total store space. Table 8 shows the comparison of space charges at the selected sales levels.

Miscellaneous Overhead Expenses

The miscellaneous overhead analysis consists of 10 basic categories of expenses that occur in most retail food stores. These categories include the manager's salary, administrative, advertising, promotion, repairs and maintenance, taxes, insurance, utilities, accounting and legal, and other expenses. Each expense category, except taxes and insurance, was allocated to the various volume bakery departments by the percentage of bakery sales to total store sales which was established at 6 percent. Taxes and insurance costs were allocated on a square footage basis in relation to the total size of store. These two techniques of determining costs provide the opportunity to allocate the various expenses in a manner which most directly reflects upon their source.

As shown in table 9 total miscellaneous overhead expenses were slightly lower in the bake-off system for all three levels of sales, since smaller space requirements resulted in lower weekly expenses for tax and insurance. Tables 17 through 19 shows a detailed breakdown of the expenses for the three selected volumes in each system.

Total Overhead

Total weekly equipment, space, and miscellaneous overhead expenses at the three selected sales levels are summarized in table 10. Total overhead costs for bake-offs are lower at all sales levels.

Combined overhead charges per unit for the 25 products showed that the on-premise system was higher by 10.8 percent at the $1,200 sales level, 16.7 percent at the $2,400 sales level, and 12.1 percent at the $3,600 sales level. At the $3,600 volume level, however, the additional requirements for equipment and production space were not being used to full capacity as they were when the volume doubled from $1,200 to $2,400. Table 20 gives a detailed allocation of total overhead costs.

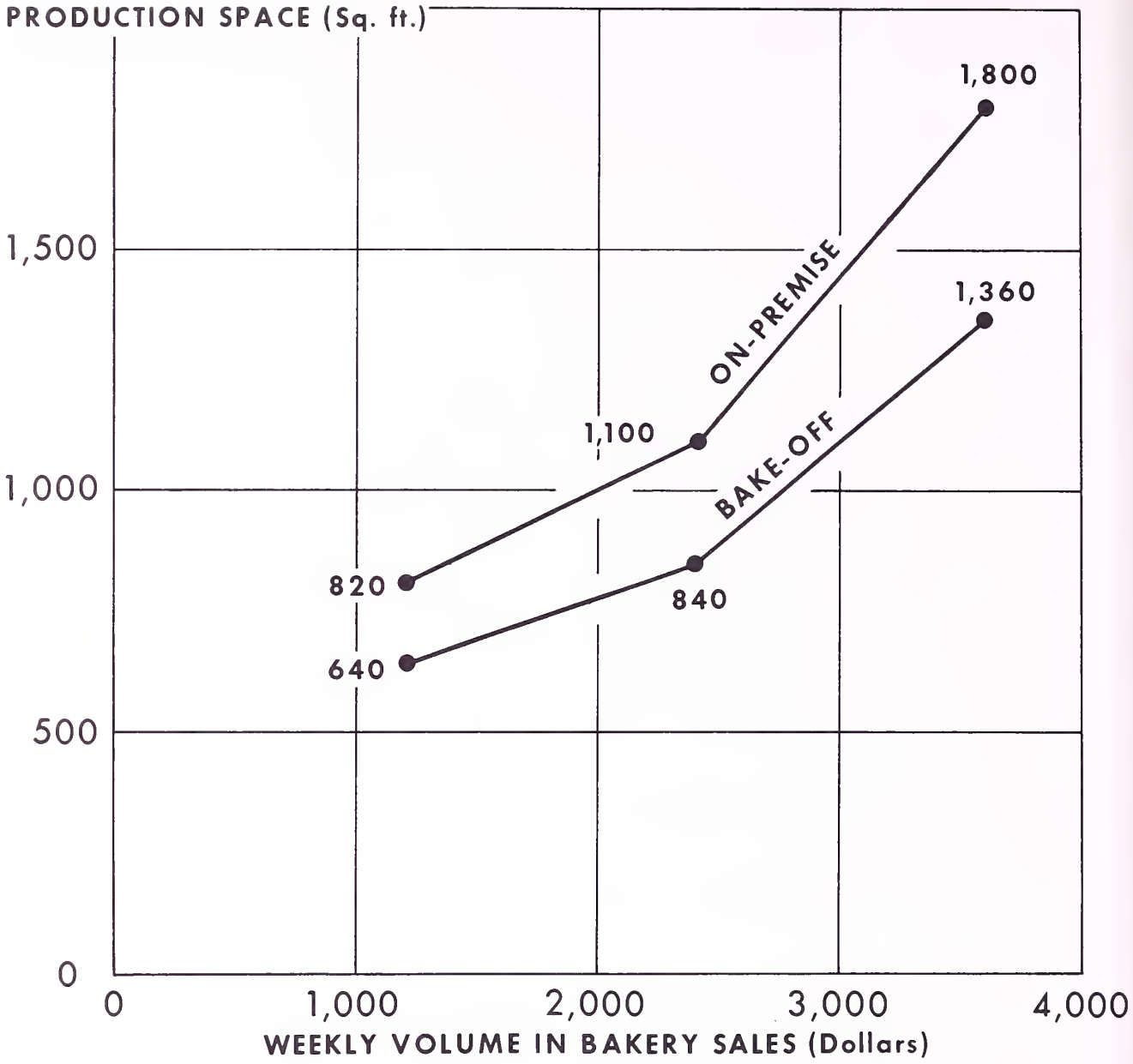

FIGURE 6.--Comparative requirements for production space for on-premise and bake-off retail bakery departments.

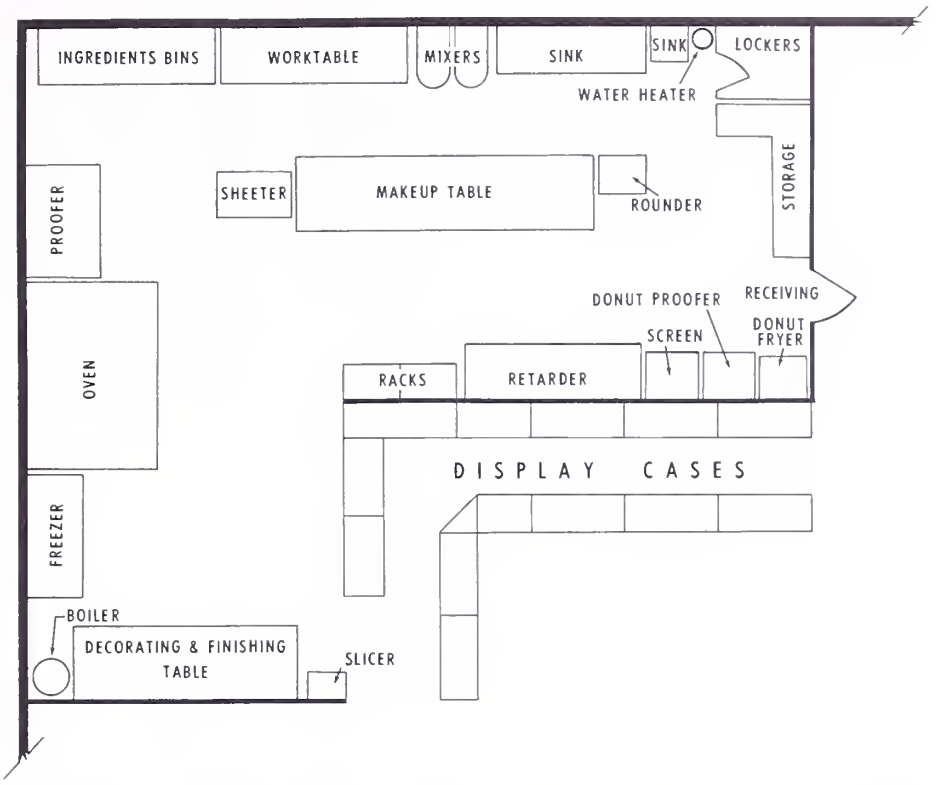

FIGURE 7.--L-shaped layout for a medium volume on-premise bakery department.

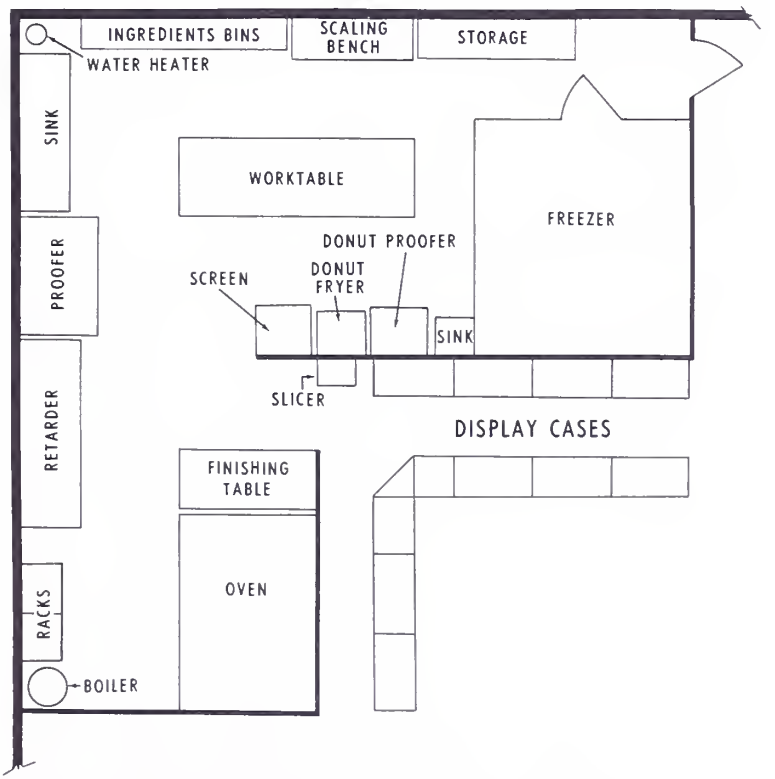

FIGURE 8.--L-shaped layout for a medium volume bake-off bakery department.

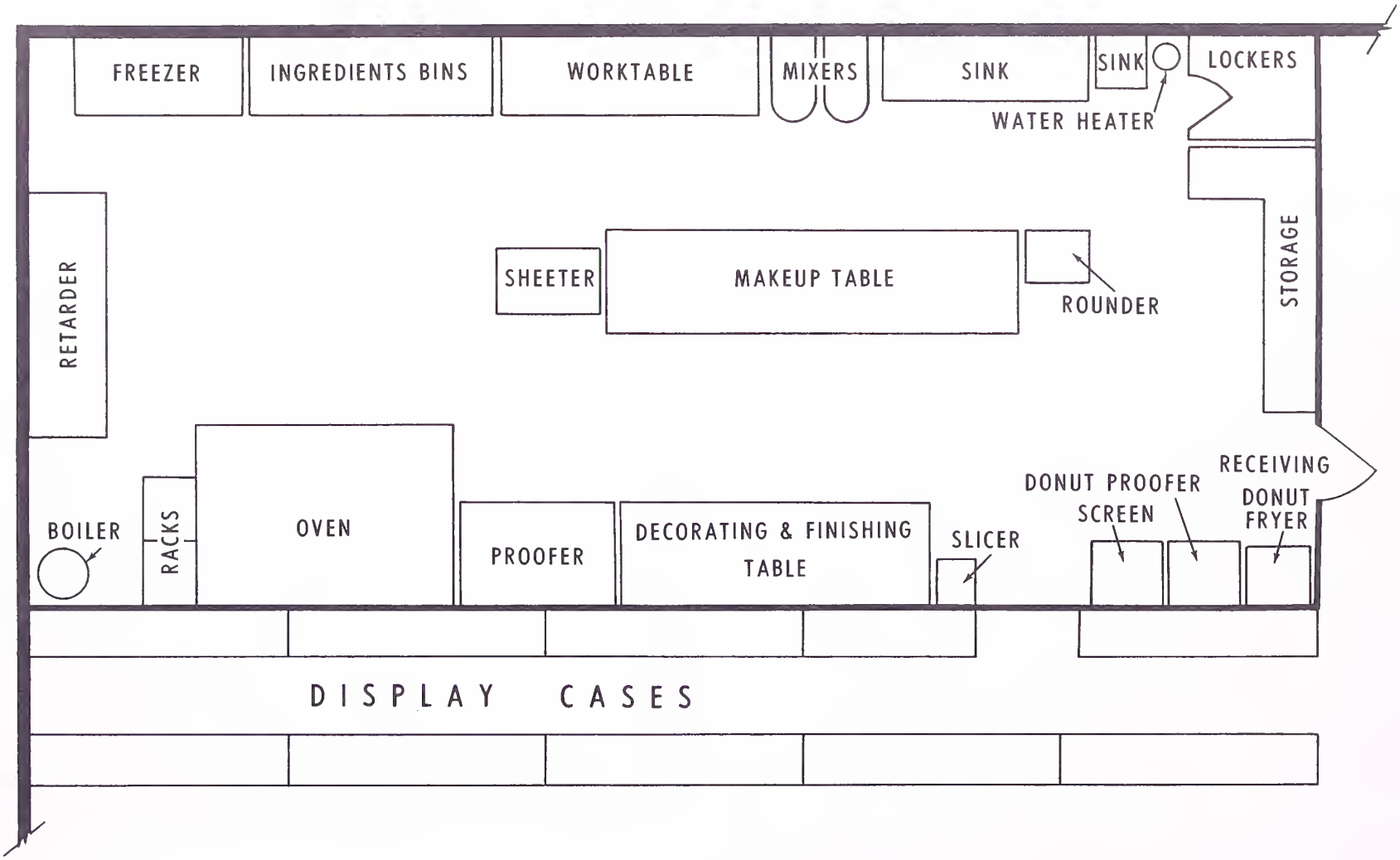

FIGURE 9.--Rectangular layout for a medium volume on-premise bakery department.

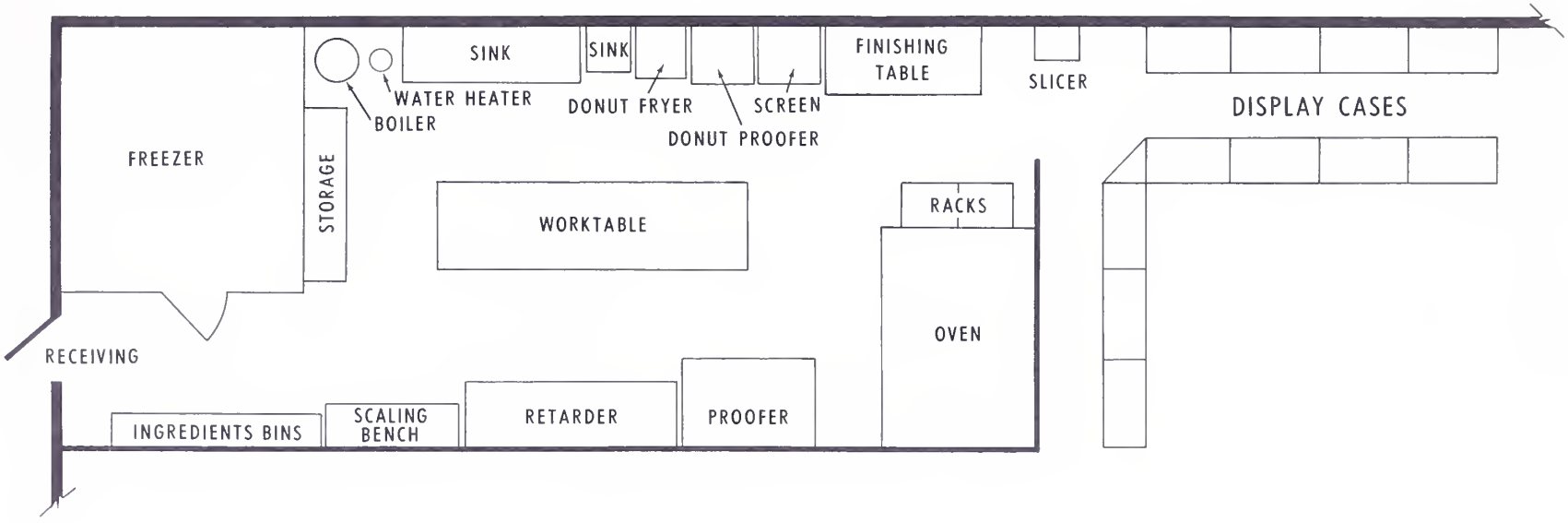

FIGURE 10.--Rectangular layout for a medium volume bake-off bakery department.

Table 8.--Comparison of space needed and weekly charges for space for on-premise and bake-off bakeries at selected bakery sales[1]

Weekly bakery sales	On-premise		Bake-off	
	Space	Expense	Space	Expense
	Square feet	Dollars	Square feet	Dollars
$1,200...	820	8.20	640	6.40
$2,400...	1,100	13.60	840	10.38
$3,600...	1,800	42.28	1,360	31.95

[1] Calculation of space charges is shown in table 16.

Table 9.--Comparison of bakery sales and weekly miscellaneous overhead expenses for on-premise and bake-off bakeries at selected weekly sales of retail stores

Weekly store sales	Weekly bakery sales	Weekly operating expenses	
		On-premise	Bake-off
	Dollars	Dollars	Dollars
$20,000.....	1,200	[1] 53.22	[1] 51.35
$40,000.....	2,400	[2] 88.98	[2] 85.90
$60,000.....	3,600	[3] 210.63	[3] 199.62

[1] From table 17.
[2] From table 18.
[3] From table 19.

Table 10.--Comparison of weekly overhead charges for on-premise and bake-off bakeries at 3 selected weekly sales levels

Expense	On-premise sales			Bake-off sales		
	$1,200	$2,400	$3,600	$1,200	$2,400	$3,600
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Equipment.....	57.20	77.91	103.63	48.08	54.11	81.68
Space.....	8.20	13.60	42.28	6.40	10.38	31.95
Miscellaneous overhead expenses...	53.22	88.98	210.63	51.35	85.90	199.62
Total.....	118.62	180.49	356.54	105.83	150.39	313.25

COMBINED LABOR, INGREDIENT, AND OVERHEAD COSTS

Combined costs per unit of labor, ingredients, and overhead showed that all categories of bakery products (except doughnuts) were produced cheaper in the on-premise bakery system (table 11). Production costs for the selected product mix averaged 22.7 percent less at the $1,200 and $2,400 volume levels and 22.0 percent less at the $3,600 level in the on-premise departments compared with the bake-off departments.

Labor and overhead charges per unit were cheaper in the bake-off system for all categories studied except doughnuts. However, considerably higher costs per unit for ingredients in the bake-off system resulted in higher overall production costs for this system. A comparison of individual categories showed that bread, rolls, and Danish pastries were produced considerably cheaper in the on-premise system (table 11). Doughnuts were produced identically in the two systems, but slightly lower overhead charges per unit in bake-offs accounted for smaller production charges in this system.

Table 11.--Comparison of costs per unit for production labor, ingredients, and miscellaneous overhead expenses at 3 selected sales levels in on-premise and bake-off bakery departments, by specified category of bakery product

Bakery department sales and product	On-premise[1]					Bake-off[2]					Difference	
	Total units produced	Cost per unit				Total units produced	Cost per unit					
		Labor	Ingredients	Overhead	Total		Labor	Ingredients	Overhead	Total	Col. 11 - col. 6	Col. 12 - col. 11
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	No.	Cents	Cents	Cents	Cents	No.	Cents	Cents	Cents	Cents	Cents	Pct.
$1,200 per week:												
Bread	151	3.23	9.11	2.12	14.45	151	2.56	16.72	1.89	21.17	6.72	31.7
Rolls	576	.48	.78	.27	1.53	576	.16	1.56	.24	2.59	1.06	40.9
Danish pastry	288	1.72	4.71	1.32	7.75	288	.37	9.38	1.18	10.94	3.19	29.2
Pies	18	10.10	22.35	5.31	37.76	18	1.02	37.39	4.74	43.15	5.39	12.5
Cupcakes	288	.57	2.60	.54	3.71	288	.29	3.90	.48	4.67	.96	20.6
Cakes	56	12.08	24.84	12.56	49.49	56	5.84	42.47	11.20	59.51	10.02	16.8
Doughnuts	672	1.00	1.40	.48	2.87	672	1.00	1.40	.43	2.82	-.05	-1.8
Weighted average	--	--	--	--	--	--	--	--	--	--	1.68	22.7
$2,400 per week:												
Bread	302	2.90	9.11	1.61	13.61	302	2.56	16.72	1.34	20.61	7.00	34.0
Rolls	1,152	.45	.78	.20	1.43	1,152	.16	1.56	.17	1.89	.46	24.3
Danish pastry	576	1.53	4.71	1.00	7.23	576	.37	9.38	.84	10.60	3.37	31.8
Pies	36	8.53	22.35	4.04	34.91	36	.97	37.39	3.37	41.73	6.82	16.3
Cupcakes	576	.55	2.60	.41	3.56	576	.28	3.90	.34	4.52	.96	21.2
Cakes	112	11.75	24.84	9.55	46.14	112	5.82	42.47	7.96	56.25	10.11	18.0
Doughnuts	1,344	.90	1.40	.36	2.65	1,344	.90	1.40	.30	2.59	-.06	-2.3
Weighted average	--	--	--	--	--	--	--	--	--	--	1.57	22.7
$3,600 per week:												
Bread	453	3.00	9.11	2.12	14.22	453	2.56	16.72	1.86	21.13	6.91	32.7
Rolls	1,728	.45	.78	.27	1.50	1,728	.16	1.56	.23	1.95	.45	23.1
Danish pastry	864	1.42	4.71	1.32	7.45	864	.37	9.38	1.16	10.92	3.47	31.8
Pies	54	7.92	22.35	5.32	35.59	54	.96	37.39	4.68	43.03	7.44	17.3
Cupcakes	864	.55	2.60	.54	3.69	864	.28	3.90	.47	4.65	.96	20.6
Cakes	168	11.77	24.84	12.58	49.19	168	5.81	42.47	11.05	59.34	10.15	17.1
Doughnuts	2,016	.89	1.40	.48	2.77	2,016	.89	1.40	.42	2.71	-.06	-2.2
Weighted average	--	--	--	--	--	--	--	--	--	--	1.58	22.0

[1] From table 21.
[2] From table 22.

CONCLUSIONS AND OBSERVATIONS

Findings of the study showed that the on-premise in-store bakery system had lower production costs than the bake-off system at the three sales levels studied. If the industry could reduce the cost of ingredients necessary in the bake-off system, then production costs would compare favorably with the on-premise system.

On the basis of other information collected, a low-volume operation, such as one with $300 weekly bakery sales, would be cheaper to operate as a bake-off than an on-premise operation. Bake-off operations give the effect of one-stop shopping to the customer, producing an aroma of freshly baked products characteristic of the on-premise system. Capital investment in equipment and space is considerably less in the bake-off than in the on-premise system, thereby providing the low-volume operator an in-store bakery for a relatively low initial investment. Labor also follows this same pattern since fewer employees are needed and wage cost per hour is lower in bake-off departments.

The future of the bake-off system as a high-volume department looks favorable. New processes for premixing and freezing ingredients are

opening up many alternative opportunities for reducing production costs in bake-off departments.

Managers of bakery departments should realize the importance of varieties and the positive effect these items can have on sales. Operators of bake-off departments should make a special effort to widen their line of products. With the same variety mix, it seems highly probable that a bake-off could be brought closer to the volume level expected of an on-premise bakery.

More time should be devoted to training production employees in the basic art of decorating and creativity. However, training should not end with the art of production but should be extended into such other fields as the art of keeping and using production records effectively. The study showed that many bakery managers did not keep proper records to help them in their daily decision making of what and how much to produce. Specials, for example, are excellent in drawing customers' attention to the bakery department, but records are needed of past performances of such specialties.

Management should realize the importance of an effective pricing policy. Firms should become more concerned over the actual production costs that must be covered in setting product prices. An actual costing analysis should be done in each bakery department so that management has an accurate picture of product costs. The analysis need not include the detail that was presented in this report, but a close estimate of costs for labor and ingredients should be known for all products. Once costs are established, then management, at least, has a base for developing better pricing techniques.

Bakery departments should have adequate equipment to allow the production function to operate smoothly. Top management in some companies believed the on-premise bakeries has excessive space and equipment. While these departments do require considerable space and much expensive equipment, the authors did not find any excess equipment or space in the case study stores. Some of the bake-off operations did not have enough equipment and some did not have the proper equipment which might affect the quality of the products produced for sale.

Equipment requirements should be carefully evaluated before installing a bakery department. Innovations and new designs in equipment result in equipment that has multifunctions and could reduce costs, especially in low-volume bake-off operations.

Proper scheduling of labor should be carefully considered in all bakery departments. Since labor is such a big expense item, it should be carefully controlled. This is especially true in very low-volume bakeries (that is, firm A) where effective allocation of labor is necessary to achieve even the minimum returns.

All of these principles are important to the success of either an on-premise or a bake-off bakery system.

APPENDIX

EXHIBIT 1.--Depreciation calculations, 3 selected sales levels, on-premise and bake-off bakeries

Weekly depreciation costs of equipment written off over an 8-year period for three sales levels follow.

A. $1,200 weekly sales operation:

1.--On-premise: $18,735 ÷ 416 weeks ---------- $45.04

2.--Bake-off: $15,750 ÷ 416 weeks ---------- $37.86

B. $2,400 weekly sales operation:

1.--On-premise: $25,520 ÷ 416 weeks ---------- $61.35

2.--Bake-off: $17,725 ÷ 416 weeks ---------- $42.61

C. $3,600 weekly sales operation:

1.--On-premise: $33,946 ÷ 416 weeks ---------- $81.60

2.--Bake-off: $26,755 ÷ 416 weeks ---------- $64.31

EXHIBIT 2.--Interest calculations, 3 selected sales levels, on-premise and bake-off bakeries

The formula for calculating interest on equipment costs per week is as follows:

$$I = E \times R \frac{(N + 1)}{2N},$$

where: I = Average interest,

E = Cost of equipment,

R = Interest rate (6 percent), and

N = Expected life of equipment in years (8 years).

Weekly interest on equipment for--

A) $1,200 weekly sales operation:

1) On-premise: $\$18,735 \times \frac{0.06(8+1)}{2(8)} \div 52$ weeks---------- $12.16

2) Bake-off: $\$15,750 \times \frac{0.06(8+1)}{2(8)} \div 52$ weeks---------- $10.22

B) $2,400 weekly sales operation:

1) On-premise: $\$25,520 \times \frac{0.06(8+1)}{2(8)} \div 52$ weeks---------- $16.56

2) Bake-off: $\$17,725 \times \frac{0.06(8+1)}{2(8)} \div 52$ weeks---------- $11.50

C) $3,600 weekly sales operation:

1) On-premise: $\$33,946 \times \frac{0.06(8+1)}{2(8)} \div 52$ weeks---------- $22.03

2) Bake-off: $\$26,755 \times \frac{0.06(8+1)}{2(8)} \div 52$ weeks---------- $17.37

Table 12.--Comparison of time and cost per unit required for selected product mix in on-premise and bake-off bakery departments at 3 selected sales levels

Product	$1,200 weekly sales					$2,400 weekly sales					$3,600 weekly sales				
	Total units	On-premise		Bake-off		Total units	On-premise		Bake-off		Total units	On-premise		Bake-off	
		Time per unit	Cost per unit	Time per unit	Cost per unit		Time per unit	Cost per unit	Time per unit	Cost per unit		Time per unit	Cost per unit	Time per unit	Cost per unit
	No.	Min.	Cents	Min.	Cents	No.	Min.	Cents	Min.	Cents	No.	Min.	Cents	Min.	Cents
Bread:															
White, 19 oz.....	34	0.493	3.07	0.491	2.12	68	0.386	2.40	0.485	2.10	102	0.423	2.64	0.485	2.10
White, 27 oz.....	23	.587	3.66	.491	2.12	46	.435	2.71	.485	2.10	69	.496	3.09	.485	2.10
French, 19 oz.....	35	.451	2.81	.554	2.39	70	.442	2.75	.554	2.39	105	.439	2.73	.554	2.39
French seeded, 27 oz.....	24	.611	3.81	.976	4.22	48	.600	3.74	.976	4.22	72	.598	3.73	.976	4.22
Italian, 19 oz.....	35	.500	3.12	.536	2.32	70	.492	3.07	.536	2.32	105	.490	3.05	.536	2.32
Total or weighted average	151	.518	3.23	.593	2.56	302	.465	2.90	.591	2.56	453	.481	3.00	.591	2.56
Rolls:															
Dinner, 1.25 oz.....	360	.064	.40	.030	.13	720	.061	.38	.029	.13	1,080	.060	.37	.029	.13
Round, 1.75 oz.....	216	.097	.60	.048	.21	432	.092	.57	.047	.20	648	.091	.57	.047	.20
Total or weighted average	576	.076	.48	.038	.16	1,152	.073	.45	.036	.16	1,728	.072	.45	.036	.16
Danish pastry:															
Individual, round, 1.5 oz..	140	.260	1.62	.075	.32	280	.236	1.47	.075	.32	420	.222	1.38	.074	.32
Individual, long, 1.5 oz...	135	.237	1.48	.075	.32	270	.213	1.33	.075	.32	405	.199	1.24	.074	.32
Blueberry, coffee cake.....	13	.854	5.32	.343	1.48	26	.666	4.15	.343	1.48	39	.607	3.78	.343	1.48
Total or weighted average	288	.276	1.72	.087	.37	576	.245	1.53	.087	.37	864	.229	1.42	.086	.37
Pies:															
Coconut custard, 8 in.....	12	1.333	8.30	.235	1.02	24	1.027	6.40	.225	.97	36	.905	5.64	.222	.96
Cherry, 8 in.....	2	2.199	13.70	.235	1.02	4	2.052	12.78	.225	.97	6	2.003	12.48	.222	.96
Apple, 8 in.....	2	2.199	13.70	.235	1.02	4	2.052	12.78	.225	.97	6	2.003	12.48	.222	.96
Peach, 8 in.....	2	2.199	13.70	.235	1.02	4	2.052	12.78	.225	.97	6	2.003	12.48	.222	.96
Total or weighted average	18	1.622	10.10	.235	1.02	36	1.369	8.53	.225	.97	54	1.271	7.92	.222	.96
Cupcakes iced, 1.5 oz.....	288	.091	.57	.066	.29	576	.089	.55	.064	.28	864	.089	.55	.064	.28
Total or weighted average..	288	.091	.57	.066	.29	576	.089	.55	.064	.28	864	.089	.55	.064	.28
Cakes:															
Yellow layer, iced, 7 in...	24	2.260	14.08	1.708	7.38	48	2.223	13.85	1.703	7.36	72	2.236	13.93	1.702	7.35
Yellow layer, iced, 8 in...	18	2.423	15.10	1.817	7.85	36	2.377	14.81	1.812	7.83	54	2.393	14.91	1.811	7.82
Angelfood, bar, 15 oz.....	10	.792	4.93	.124	.54	20	.707	4.40	.120	.52	30	.679	4.23	.120	.52
Angelfood, round, 17 oz....	4	.707	4.40	.185	.80	8	.599	3.73	.182	.79	12	.561	3.50	.181	.78
Total or weighted average	56	1.939	12.08	1.351	5.84	112	1.886	11.75	1.347	5.82	168	1.889	11.77	1.346	5.81
Doughnuts:															
Raised:															
Sugared, 1 oz.....	60	.223	.96	.223	.96	120	.210	.91	.210	.91	180	.213	.92	.213	.92
Glazed, 1 oz.....	324	.186	.80	.186	.80	648	.177	.76	.177	.76	972	.179	.77	.179	.77
Filled, 1 oz.....	144	.321	1.39	.321	1.39	288	.277	1.20	.277	1.20	432	.279	1.21	.279	1.21
Cake:															
Plain, 1.5 oz.....	48	.171	.74	.171	.74	96	.139	.60	.139	.60	144	.131	.57	.131	.57
Sugared, 1.5 oz.....	48	.282	1.22	.282	1.22	96	.244	1.05	.244	1.05	144	.229	.99	.229	.99
Chocolate, 1.5 oz.....	48	.279	1.21	.279	1.21	96	.240	1.04	.240	1.04	144	.230	.99	.230	.99
Total or weighted average.....	672	.231	1.00	.231	1.00	1,344	.208	.90	.208	.90	2,016	.207	.89	.207	.89

Table 13.--Costs of ingredients per unit for selected product mix in bake-off bakery departments compared with on-premise departments at $1,200 weekly sales level

Product	Total units produced	Costs per unit		Increased cost for bake-offs
		On-premise	Bake-offs	
	Number	Cents	Cents	Cents
Bread:				
White, 19 oz	34	6.99	14.90	7.91
White, 27 oz	23	9.94	21.17	11.23
French, 19 oz	35	8.54	14.40	5.86
French seeded, 27 oz	24	12.95	21.78	8.83
Italian, 19 oz	35	8.54	14.40	5.86
Total or weighted average	151	9.11	16.72	7.61
Rolls:				
Dinner, 1.25 oz	360	.68	1.25	.57
Round, 1.75 oz	216	.95	2.08	1.13
Total or weighted average	576	.78	1.56	.78
Danish pastry:				
Individual round, 1.5 oz	140	3.96	8.06	4.10
Individual long, 1.5 oz	135	3.96	8.06	4.10
Blueberry coffee cake, 9 oz	13	20.50	37.40	16.90
Total or weighted average	288	4.71	9.38	4.67
Pies:				
Coconut custard, 8 in	12	16.71	36.00	19.29
Cherry, 8 in	2	38.28	44.33	6.05
Apple, 8 in	2	30.00	36.00	6.00
Peach, 8 in	2	32.57	40.17	7.60
Total or weighted average	18	22.35	37.39	15.04
Cupcakes, iced 1.5 oz	288	2.60	3.90	1.30
Total or weighted average	288	2.60	3.90	1.30
Cakes:				
Yellow layer, iced, 7 in	24	21.86	38.74	16.88
Yellow layer, iced, 8 in	18	35.70	54.74	19.04
Angelfood, bar. 15 oz	10	14.00	28.97	14.97
Angelfood, round, 17 oz	4	21.00	43.43	22.43
Total or weighted average	56	24.84	42.47	17.63
Doughnuts:				
Raised:				
Sugared, 1 oz	60	1.10	1.10	--
Glazed, 1 oz	324	1.30	1.30	--
Filled, 1 oz	144	1.70	1.70	--
Cake:				
Plain, 1.5 oz	48	1.38	1.38	--
Sugared, 1.5 oz	48	1.39	1.39	--
Chocolate, 1.5 oz	48	1.54	1.54	--
Total or weighted average	672	1.40	1.40	--

Table 14.--Equipment required, cost per unit, and total cost for on-premise bakeries at 3 selected sales levels[1]

Equipment	$1,200 weekly sales			$2,400 weekly sales			$3,600 weekly sales		
	Units required	Cost		Units required	Cost		Units required	Cost	
		Per unit	Total		Per unit	Total		Per unit	Total
	No.	Dol.	Dol.	No.	Dol.	Dol.	No.	Dol.	Dol.
Oven:									
12 pan, gas or electric	1	4,190	4,190	--	--	--	1	4,190	4,190
16 pan, gas-fired	--	--	--	1	4,750	4,750	--	--	--
20 pan, gas-fired	--	--	--	--	--	--	1	5,020	5,020
Mixer, vertical:									
80 qt	1	2,150	2,150	2	2,150	4,300	2	2,150	4,300
20 qt	1	650	650	1	650	650	1	650	650
Proof cabinet	1	1,625	1,625	1	1,625	1,625	2	[2] 2,063	4,126
Freezer:									
4 section	1	2,700	2,700	1	2,700	2,700	--	--	--
6 section	--	--	--	--	--	--	1	3,700	3,700
Retarder:									
2 section	1	1,350	1,350	--	--	--	--	--	--
4 section walk-in	--	--	--	1	1,800	1,800	--	--	--
4 section roll-in	--	--	--	--	--	--	1	2,150	2,150
Doughnut fryer and plunger-type cutter	1	875	875	1	875	875	1	[2] 925	925
Makeup bench	1	525	525	2	525	1,050	2	525	1,050
Bun diver and rounder	1	350	350	1	1,475	1,475	1	1,475	1,475
Molder-sheeter	--	--	--	1	950	950	1	[2] 1,000	1,000
Single-tub sink	1	110	110	1	110	110	1	110	110
Miscellaneous	--	--	4,210	--	--	5,235	--	--	5,250
Total	--	--	18,735	--	--	25,520	--	--	33,946

[1] Excludes freight and installation charges in total costs. Installation costs for $1,200 weekly sales would be an additional $4,500; for $2,400 weekly sales, $5,500; for $3,600 weekly sales, $6,300.
[2] Large size.

Table 15.--Equipment required, cost per unit, and total cost for bake-off bakeries at 3 selected sales levels[1]

Equipment	$1,200 weekly sales			$2,400 weekly sales			$3,600 weekly sales		
	Units required	Cost		Units required	Cost		Units required	Cost	
		Per unit	Total		Per unit	Total		Per unit	Total
	No.	Dol.	Dol.	No.	Dol.	Dol.	No.	Dol.	Dol.
Oven:									
12 pan, gas or electric	1	4,190	4,190	--	--	--	1	4,190	4,190
16 pan, gas-fired	--	--	--	1	4,750	4,750	--	--	--
20 pan, gas-fired	--	--	--	--	--	--	1	5,020	5,020
Mixer, vertical, 20 qt	1	650	650	1	650	650	1	650	650
Proof cabinet	1	1,625	1,625	1	1,625	1,625	2	[2] 2,063	4,126
Freezer:									
6 section	1	3,700	3,700	--	--	--	--	--	--
Walk-in	--	--	--	1	3,590	3,590	1	[2] 4,810	4,810
Retarder, 2 section	1	1,350	1,350	--	--	--	--	--	--
Defroster-retarder, 4 section	--	--	--	1	2,100	2,100	1	2,100	2,100
Doughnut fryer and plunger-type cutter	1	875	875	1	875	875	1	[2] 925	925
Single-tub sink	1	110	110	1	110	110	1	110	110
Miscellaneous	--	--	3,250	--	--	4,025	--	--	4,824
Total	--	--	15,750	--	--	17,725	--	--	26,755

[1] Excludes freight and installation charges in total costs. Installation costs for $1,200 weekly sales would be an additional $3,800; for $2,400 weekly sales, $4,200; for $3,600 weekly sales, $5,400.
[2] Large size.

Table 16.--Comparison of charges for space at selected sales levels for retail food stores and on-premise and bake-off bakery departments

Weekly store sales	Weekly bakery sales	Total store		Rental charge per square foot[2]	On-premise		Bake-off	
		Size	Rent per week[1]		Size of department	Rent per week	Size of department	Rent per week
	Dol.	Sq. ft.	Dol.	Cents	Sq. ft.	Dol.	Sq. ft.	Dol.
$20,000	1,200	15,000	149.89	1.000	820	8.20	640	6.40
$40,000	2,400	24,000	296.58	1.236	1,100	13.60	840	10.38
$60,000	3,600	30,000	704.71	2.349	1,800	42.28	1,360	31.95

[1] From Indiana (Purdue) Extension Service, Department of Agricultural Economics, Business Summary and Analysis of Independent Food Stores, 1964.
[2] Charge per square foot increases as size of store increases. It was assumed that the higher volume stores are in densely populated areas; consequently, higher rents are expected.

Table 17.--Miscellaneous overhead expenses for on-premise and bake-off bakeries with $1,200 sales per week located in $20,000 per week stores[1]

Expense	Total store expense		Allocation of total expenses			Bakery expense per week	
	Per year	Per week	Source	On-premise	Bake-off	On-premise	Bake off
	Dollars	Dollars		Percent	Percent	Dollars	Dollars
Manager's salary.....	7,836	150.69	Sales	6.0	6.0	9.04	9.04
Administrative.....	3,977	76.48	Sales	6.0	6.0	4.59	4.59
Advertising.....	8,993	172.94	Sales	6.0	6.0	10.38	10.38
Promotion.....	5,672	109.08	Sales	6.0	6.0	6.54	6.54
Repairs, maintenance.....	1,738	33.42	Sales	6.0	6.0	2.01	2.01
Other.....	3,388	65.15	Sales	6.0	6.0	3.91	3.91
Taxes.....	5,806	111.65	Sq. ft.	5.5	4.3	6.14	4.80
Insurance.....	2,276	43.77	Sq. ft.	5.5	4.3	2.41	1.88
Utilities.....	6,119	117.67	Sales	6.0	6.0	7.06	7.06
Accounting and legal.....	992	19.08	Sales	6.0	6.0	1.14	1.14
Total.....	--	--	--	--	--	53.22	51.35

[1] Indiana (Purdue) Extension Service, Department of Agricultural Economics, Business Summary and Analysis of Independent Food Stores, pp. 5-56, 1964.

Table 18.--Miscellaneous overhead expenses for on-premise and bake-off bakeries with $2,400 sales per week located in $40,000 per week stores[1]

Expense	Total store expense		Allocation of expenses			Bakery expense per week	
	Per year	Per week	Source	On-premise	Bake-off	On-premise	Bake-off
	Dollars	Dollars		Percent	Percent	Dollars	Dollars
Manager's salary.....	9,458	181.88	Sales	6.0	6.0	10.91	10.91
Administrative.....	14,261	274.25	Sales	6.0	6.0	16.46	16.46
Advertising.....	15,195	292.21	Sales	6.0	6.0	17.53	17.53
Promotion.....	5,509	105.94	Sales	6.0	6.0	6.36	6.36
Repairs, maintenance.....	3,815	73.37	Sales	6.0	6.0	4.40	4.40
Other.....	7,484	143.92	Sales	6.0	6.0	8.64	8.64
Taxes.....	11,580	222.69	Sq. ft.	4.6	3.5	10.24	7.79
Insurance.....	2,948	56.69	Sq. ft.	4.6	3.5	2.61	1.98
Utilities.....	8,765	168.56	Sales	6.0	6.0	10.11	10.11
Accounting and legal.....	1,494	28.73	Sales	6.0	6.0	1.72	1.72
Total.....	--	--	--	--	--	88.98	85.90

[1] Indiana (Purdue) Extension Service, Department of Agricultural Economics, Business Summary and Analysis of Independent Food Stores, pp. 5-56, 1964.

Table 19.--Miscellaneous overhead expenses for on-premise and bake-off bakeries with $3,600 sales per week located in $60,000 per week stores[1]

Expense	Total store expense		Allocation of expenses			Bakery expense per week	
	Per year	Per week	Source	On-premise	Bake-off	On-premise	Bake-off
	Dollars	Dollars		Percent	Percent	Dollars	Dollars
Manager's salary.....	14,106	271.27	Sales	6.0	6.0	16.28	16.28
Administrative.....	38,007	730.90	Sales	6.0	6.0	43.85	43.85
Advertising.....	34,472	662.92	Sales	6.0	6.0	39.78	39.78
Promotion.....	17,349	333.63	Sales	6.0	6.0	20.02	20.02
Repairs, maintenance.....	8,172	157.15	Sales	6.0	6.0	9.43	9.43
Other.....	12,809	246.33	Sales	6.0	6.0	14.78	14.78
Taxes.....	30,775	591.83	Sq. ft.	6.0	4.5	35.51	26.63
Insurance.....	7,393	142.17	Sq. ft.	6.0	4.5	8.53	6.40
Utilities.....	15,890	305.58	Sales	6.0	6.0	18.33	18.33
Accounting and legal.....	3,567	68.60	Sales	6.0	6.0	4.12	4.12
Total.....	--	--	--	--	--	210.63	199.62

[1] Indiana (Purdue) Extension Service, Department of Agricultural Economics, Business Summary and Analysis of Independent Food Stores, pp. 5-56, 1964.

Table 20.--Comparison of overhead charges per unit product at selected weekly sales for on-premise and bake-off bakeries

Product	$1,200 weekly sales		$2,400 weekly sales		$3,600 weekly sales	
	On-premise	Bake-off	On-premise	Bake-off	On-premise	Bake-off
	Cents	Cents	Cents	Cents	Cents	Cents
Bread.....	2.12	1.89	1.61	1.34	2.12	1.86
Rolls.....	.27	.24	.20	.17	.27	.23
Danish pastry.....	1.32	1.18	1.00	.84	1.32	1.16
Pies.....	5.31	4.74	4.04	3.37	5.32	4.68
Cupcakes.....	.54	.48	.41	.34	.54	.47
Cakes.....	12.56	11.20	9.55	7.96	12.58	11.05
Doughnuts.....	.48	.43	.36	.30	.48	.42
Total.....	22.60	20.16	17.17	14.32	22.63	19.87

Table 21.--Total costs per item for production labor, ingredients, and operating at 3 selected sales levels in on-premise bakery operations

Product	$1,200 sales level					$2,400 sales level					$3,600 sales level				
	Units produced	Cost per item				Units produced	Cost per unit				Units produced	Cost per unit			
		Labor	Ingredients	Operating	Total		Labor	Ingredients	Operating	Total		Labor	Ingredients	Operating	Total
	No.	Cents	Cents	Cents	Cents	No.	Cents	Cents	Cents	Cents	No.	Cents	Cents	Cents	Cents
Bread:															
White, 19 oz.	34	3.07	6.99	2.12	12.18	68	2.40	6.99	1.61	11.00	102	2.64	6.99	2.12	11.75
White, 27 oz.	23	3.66	9.94	2.12	15.72	46	2.71	9.94	1.61	14.26	69	3.09	9.94	2.12	15.15
French, 19 oz.	35	2.81	8.54	2.12	13.47	70	2.75	8.54	1.61	12.90	105	2.73	8.54	2.12	13.39
French, seeded, 27 oz.	24	3.81	12.95	2.12	18.88	48	3.74	12.95	1.61	18.30	72	3.73	12.95	2.12	18.80
Italian, 19 oz.	35	3.12	8.54	2.12	13.78	70	3.07	8.54	1.61	13.22	105	3.05	8.54	2.12	13.71
Total or weighted average.	151	3.23	9.11	2.12	14.45	302	2.90	9.11	1.61	13.61	453	3.00	9.11	2.12	14.22
Rolls:															
Dinner, 1.25 oz.	360	.40	.68	.27	1.35	720	.38	.68	.20	1.26	1,080	.37	.68	.27	1.32
Round, 1.75 oz.	216	.60	.95	.27	1.82	432	.57	.95	.20	1.72	648	.57	.95	.27	1.79
Total or weighted average.	576	.48	.78	.27	1.53	1,152	.45	.78	.20	1.43	1,728	.45	.78	.27	1.50
Danish pastry:															
Individual, round, 1.5 oz.	140	1.62	3.96	1.32	6.90	280	1.47	3.96	1.00	6.43	420	1.38	3.96	1.32	6.66
Individual, long, 1.5 oz.	135	1.48	3.96	1.32	6.76	270	1.33	3.96	1.00	6.29	405	1.24	3.96	1.32	6.52
Blueberry, coffee cake.	13	5.32	20.50	1.32	27.14	26	4.15	20.50	1.00	25.65	39	3.78	20.50	1.32	25.60
Total or weighted average.	288	1.72	4.71	1.32	7.75	576	1.53	4.71	1.00	7.23	864	1.42	4.71	1.32	7.45
Pies:															
Coconut custard, 8 in.	12	8.30	16.71	5.31	30.32	24	6.40	16.71	4.04	27.15	36	5.64	16.71	5.32	27.67
Cherry, 8 in.	2	13.70	38.28	5.31	57.29	4	12.78	38.28	4.04	55.10	6	12.48	38.28	5.32	56.08
Apple, 8 in.	2	13.70	30.00	5.31	49.01	4	12.78	30.00	4.04	46.82	6	12.48	30.00	5.32	47.80
Peach, 8 in.	2	13.70	32.57	5.31	51.58	4	12.78	32.57	4.04	49.39	6	12.48	32.57	5.32	50.37
Total or weighted average.	18	10.10	22.35	5.31	37.76	36	8.53	22.35	4.04	34.91	54	7.92	22.35	5.32	35.59
Cupcakes, iced, 1.5 oz.	288	.57	2.60	.54	3.71	576	.55	2.60	.41	3.56	864	.55	2.60	.54	3.69
Cakes:															
Yellow layer, iced, 7 in.	24	14.08	21.86	12.56	48.50	48	13.85	21.86	9.55	45.26	72	13.93	21.86	12.58	48.37
Yellow layer, iced, 8 in.	18	15.10	35.70	12.56	63.36	36	14.81	35.70	9.55	60.06	54	14.91	35.70	12.58	63.19
Angelfood, bar, 15 oz.	10	4.93	14.00	12.56	31.49	20	4.40	14.00	9.55	27.95	30	4.23	14.00	12.58	30.81
Angelfood, round, 17 oz.	4	4.40	21.00	12.56	37.96	8	3.73	21.00	9.55	34.28	12	3.50	21.00	12.58	37.08
Total or weighted average.	56	12.08	24.84	12.56	49.49	112	11.75	24.84	9.55	46.14	168	11.77	24.84	12.58	49.19
Doughnuts:															
Raised:															
Sugared, 1 oz.	60	.96	1.10	.48	2.54	120	.91	1.10	.36	2.37	180	.92	1.10	.48	2.50
Glazed, 1 oz.	324	.80	1.30	.48	2.58	648	.76	1.30	.36	2.42	972	.77	1.30	.48	2.55
Filled, 1 oz.	144	1.39	1.70	.48	3.57	288	1.20	1.70	.36	3.26	432	1.21	1.70	.48	3.39
Cake:															
Plain, 1.5 oz.	48	.74	1.38	.48	2.60	96	.60	1.38	.36	2.34	144	.57	1.38	.48	2.43
Sugared, 1.5 oz.	48	1.22	1.39	.48	3.09	96	1.05	1.39	.36	2.80	144	.99	1.39	.48	2.86
Chocolate, 1.5 oz.	48	1.21	1.54	.48	3.23	96	1.04	1.54	.36	2.94	144	.99	1.54	.48	3.01
Total or weighted average.	672	1.00	1.40	.48	2.87	1,344	.90	1.40	.36	2.65	2,016	.89	1.40	.48	2.77

Table 22.--Total costs per item for production labor, ingredients, and operating at 3 selected sales levels in bake-off bakery operations

Product	$1,200 sales level					$2,400 sales level					$3,600 sales level				
	Units produced	Cost per unit				Units produced	Cost per unit				Units produced	Cost per unit			
		Labor	Ingredients	Operating	Total		Labor	Ingredients	Operating	Total		Labor	Ingredients	Operating	Total
	No.	Cents	Cents	Cents	Cents	No.	Cents	Cents	Cents	Cents	No.	Cents	Cents	Cents	Cents
Bread:															
White, 19 oz.	34	2.12	14.90	1.89	18.91	68	2.10	14.90	1.34	18.34	102	2.10	14.90	1.86	18.86
White, 17 oz.	23	2.12	21.17	1.89	25.18	48	2.10	21.17	1.34	24.61	69	2.10	21.17	1.86	25.13
French, 19 oz.	35	2.39	14.40	1.89	18.68	70	2.39	14.40	1.34	18.13	105	2.39	14.40	1.86	18.65
French, seeded, 27 oz.	24	4.22	21.78	1.89	27.89	48	4.22	21.78	1.34	27.34	72	4.22	21.78	1.86	27.86
Italian, 19 oz.	35	2.32	14.40	1.89	18.61	70	2.32	14.40	1.34	18.06	105	2.32	14.40	1.86	18.58
Total or weighted average.	151	2.56	16.72	1.89	21.17	302	2.56	16.72	1.34	20.61	453	2.56	16.72	1.86	21.13
Rolls:															
Dinner, 1.25 oz.	360	.13	1.25	.24	1.62	720	.13	1.25	.17	1.55	1,080	.13	1.25	.23	1.61
Round, 1.75 oz.	216	.21	2.08	.24	2.53	432	.20	2.08	.17	2.45	648	.20	2.08	.23	2.51
Total or weighted average.	576	.16	1.56	.24	2.59	1,152	.16	1.56	.17	1.89	1,728	.16	1.56	.23	1.95
Danish pastry:															
Individual, round, 1.5 oz.	140	.32	8.06	1.18	9.56	280	.32	8.06	.84	9.22	420	.32	8.06	1.16	9.54
Individual, long, 1.5 oz.	135	.32	8.06	1.18	9.56	270	.32	8.06	.84	9.22	405	.32	8.06	1.16	9.54
Blueberry, coffee cake.	13	1.48	37.40	1.18	40.06	26	1.48	37.40	.84	39.72	39	1.48	37.40	1.16	40.04
Total or weighted average.	288	.37	9.38	1.18	10.94	576	.37	9.38	.84	10.60	864	.37	9.38	1.16	10.92
Pies:															
Coconut custard, 8 in.	12	1.02	36.00	4.74	41.76	24	.97	36.00	3.37	40.34	36	.96	36.00	4.68	41.64
Cherry, 8 in.	2	1.02	44.33	4.74	50.09	4	.97	44.33	3.37	48.67	6	.96	44.33	4.68	49.97
Apple, 8 in.	2	1.02	36.00	4.74	41.76	4	.97	36.00	3.37	40.34	6	.96	36.00	4.68	41.64
Peach, 8 in.	2	1.02	40.17	4.74	45.93	4	.97	40.17	3.37	44.51	6	.96	40.17	4.68	45.81
Total or weighted average.	18	1.02	37.39	4.74	43.15	36	.97	37.39	3.37	41.73	54	.96	37.39	4.68	43.03
Cupcakes, iced, 1.5 oz.	288	.29	3.90	.48	4.67	576	.28	3.90	.34	4.52	864	.28	3.90	.47	4.65
Cakes:															
Yellow layer, iced, 7 in.	24	7.38	38.74	11.20	57.32	48	7.36	38.74	7.96	54.06	72	7.35	38.74	11.05	57.14
Yellow layer, iced, 8 in.	18	7.85	54.74	11.20	73.79	36	7.83	54.74	7.96	70.53	54	7.82	54.74	11.05	73.61
Angelfood, bar, 15 oz.	10	.54	28.97	11.20	40.71	20	.52	28.97	7.96	37.45	30	.52	28.97	11.05	40.54
Angelfood, round, 17 oz.	4	.80	43.43	11.20	55.43	8	.79	43.43	7.96	52.18	12	.78	43.43	11.05	55.26
Total or weighted average.	56	5.84	42.47	11.20	59.51	112	5.82	42.47	7.96	56.25	168	5.81	42.47	11.05	59.34
Doughnuts:															
Raised:															
Sugared, 1 oz.	60	.96	1.10	.43	2.49	120	.91	1.10	.30	2.31	180	.92	1.10	.42	2.44
Glazed, 1 oz.	324	.80	1.30	.43	2.53	648	.76	1.30	.30	2.36	972	.77	1.30	.42	2.49
Filled, 1 oz.	144	1.39	1.70	.43	3.52	288	1.20	1.70	.30	3.20	432	1.21	1.70	.42	3.33
Cake:															
Plain, 1.5 oz.	48	.74	1.38	.43	2.55	96	.60	1.38	.30	2.28	144	.57	1.38	.42	2.37
Sugared, 1.5 oz.	48	1.22	1.39	.43	3.04	96	1.05	1.39	.30	2.74	144	.99	1.39	.42	2.80
Chocolate, 1.5 oz.	48	1.21	1.54	.43	3.18	96	1.04	1.54	.30	2.88	144	.99	1.54	.42	2.95
Total or weighted average.	672	1.00	1.40	.43	2.82	1,344	.90	1.40	.30	2.59	2,016	.89	1.40	.42	2.71

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